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**State of Utah**  
**DEPARTMENT OF NATURAL RESOURCES**  
**Division of Oil, Gas & Mining**

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Executive Director

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Division Director

October 11, 2007

Mr. Mike Perkins, Legacy Environmental Oversight Manager  
250 North Redwood Road 2<sup>nd</sup> floor  
North Salt Lake, Utah 84054

Subject: Review of Variance Request to the Notice of Intention to Commence Large Mining Operations, Utah Dept of Transportation, UDOT Beck Street Quarry, M/011/003, Davis County, Utah

Dear Mr. Perkins:

The Division has completed a review of UDOT's request for a variance at the UDOT Beck Street Quarry, M/011/003. Because the highwall variance would significantly alter the reclamation plan, this action will be considered a *revision to the plan*, which requires public notice.

At this time, this review is considered intermediary, as more studies and evaluations are required before approving the variance request. As part of the effort to move forward and gain additional important information, a Division meeting is suggested. It will also be necessary to respond to all comments provided herein.

If you have any questions in this regard please contact Beth Ericksen of the Minerals Staff. Thank you for your cooperation.

Sincerely,

Susan M. White  
Mining Program Coordinator  
Minerals Regulatory Program

SMW:BE:pb

Attachment: Review, Form MR-REV-att

cc: Mr. Todd Jensen, project director, [TODDJENSEN@UTAH.GOV](mailto:TODDJENSEN@UTAH.GOV) with attachment  
Beth Ericksen, DOGM

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**FIRST REVIEW OF NOTICE OF INTENTION TO COMMENCE LARGE MINING  
OPERATIONS (Variance)**

**UDOT  
UDOT Beck Street quarry**

**M/011/003  
September 27, 2007**

**GENERAL COMMENTS**

*The submitted MR-REV indicates the name change on page 40 to Todd Jensen. Mr. Jensen must provide his signature on this page. (BE)*

*The comments within this review are not comprehensive. A meeting is suggested and further information must be provided, including a clear operational plan update and associated update to the reclamation plan. (BE)*

*The variance submittal uses the word 'proposed' through out the narrative and on some maps. Although the plan is proposed at this time, please use verbiage that reflects approval and actual implementation of the plan. (BE)*

*Perhaps the highwall will be contingent on stability integrity as mining progresses as a result of further studies. There are several influences of slope stability such as seismic activity, moisture, and mining practices. These influences have unknown impact on stability of the highwall since they haven't occurred yet. Vulnerability concerns range from removing material from the toe and/or slope and erosion influences as well. (BE)*

*By advancing the slope how much additional material will be gained? Please include this information. (BE)*

**R647-4-105 - Maps, Drawings & Photographs**

- 105.1 Topographic base map, boundaries, pre-act disturbance  
*Provide U.S. Geological Survey style geologic hazard (Landslide) maps for the area. (BE)*
- 105.2 Drawings or Cross Sections (slopes, roads, pads, etc.)  
*As more information is obtained, it is likely that specific cross sections will be required. Including a geologic cross section. (BE)*

*Specific site reclamation maps would be required if a variance were granted. Some of the features that would be included in the map: show proposed highwall locations, areas that would be protected, permanent erosion control controls, permanent water control/diversion controls, and vegetated area. (BE)*

**R647-4-106 - Operation Plan**

- 106.2 Type of operations conducted, mining method, processing etc.  
*The variance request will result in review and expansion of the blasting plan. Provide a tailored blasting plan that will maintain the integrity of the highwall slopes at 65°. Vibration levels should be monitored and controlled. Appropriate trim blast procedures should be used. (BE)*

- 106.6 Plan for protecting & redepositing soils  
*The upper surface area contains approximately 83% vegetation. Since the vegetative coverage is great, the removal of it may increase erosion. It is expected the set back area would be revegetated. An erosion plan must be prepared and implemented. (BE)*

- 106.8 Provide depth to groundwater information.

*The narrative refers to figure 8 showing the location of the test pits, however, figure 8 is identified as "final highwall reclamation plan". Please refer to the map that correctly identifies the location of the test pits. The text indicates there is no indication of groundwater on the west side of the site, however, there is no explanation of the findings of test pits 1-4. Please submit complete information in the narrative for the results of all test pits, if the shallow depth of the eastern test pits result in inconclusive information, indicate as such or provide the reason(s) for excluding the results of those pits. Also, in the narrative, include the season(s) of year and the year the testing pits and boreholes were performed. (BE)*

*With the groundwater depth being estimated at 50-ft., there is further information required before a variance can be granted. It is necessary to establish a groundwater-control and monitoring plan that should include establishing monitoring well locations. A plugging and abandonment plan must be included. These plans are required because as mining advances and the highwall becomes established, there may be effects of groundwater on highwall stability. Groundwater levels may be affected seasonally, which may have stability consequences. It is important to determine groundwater level fluctuations over time as those fluctuations may influence stability; this would include the influence of extremely wet seasons, an intense rainfall event; and developing a management plan accordingly. (BE)*

**R647-4-107 - Operation Practices**

*Operation practices must be reviewed and addressed according to the operation plan.  
(BE)*

**R647-4-109 - Impact Assessment**

109.1 Impacts to surface & groundwater systems

*Highwall CN number determination for 'runoff', the source is a drainage manual where the CN value used is for outcrop areas. Adjustments may be necessary and appropriate judgment used considering factors such as imperviousity, land use, etc. Runoff should be considered for a 100 yr 24 hr storm event specific to the geographic area. Less infiltration at the highwall therefore resulting in greater run off potential, also affecting the run off rate. It is suspected the CN value should be increased and a recalculation specific to the highwall area should be determined. In addition, provide information as to what factors were used in expanding the acreage to 20 acres for the highwall area. (BE)*

109.2 *The text refers to figure 5 showing the topsoil and recovery areas; however, this figure is titled "Proposed Slope Design Cross Section". Please explain or correct. (BE)*

109.4 Slope stability, erosion control, air quality, safety

*The narrative has been changed reflecting the increased slope angle, however, from a mining operation standpoint, the methods should be provided for in greater detail. Including specifying the equipment types used in mining. (BE)*

*Stating the erosion is minimal because the exposed surfaces are rock is not substantial enough to warrant that it is the case. Erosion rate is influenced by several factors beyond material characteristics. Due to the proposed slope angles, mass movement or slumping potential exists, and appears to be disregarded. These types of failures are common in steep slopes. Consider the hardness of the slope material and weathering impact among other factors, because as mentioned, material characteristics are only one component of erosion rate. (BE)*

*Since the text assumes some erosion will occur, what quantity of material is considered to erode and at what rate? How much erosion can be withstood before a consequence occurs? How have drainage patterns been affected, and if they are affected, how does that influence erosion rates? (BE)*

*It is mentioned that any sediment that accumulates at the toe will be used as a material source. After mine completion, how will long-term sediment be managed in this area? SEE R647-4-110 (BE)*

*Describe how highwalls will be protected by describing appropriate long term erosion/sediment controls. Describe perimeter erosion/sediment controls. (BE)*

*If the variance were granted, a copy of the SWPPP would be required by the Division. However, a SWPPP, may minimize erosion due to good operational practices, it is only as good as the information available to develop those practices. Largely, permanent highwalls are long term and a SWPPP at the conclusion of the operations would provide no benefit. A practice such as long term monitoring may be required. (BE)*

*Please identify critical sections such as: 1) highest slope section 2) lesser height but highest percent of lower strength material (characterize the rock) 3) groundwater 4) complex slope geometry. This information may have been repeated elsewhere in this document. (BE)*

#### **R647-4-110 - Reclamation Plan**

##### **General Comments**

*Description of the topsoil material that will be placed on the highwall terraces should include a determination of texture, permeability, and engineering properties as well as the related soil-rock ratios. (BE)*

##### **110.5 Revegetation planting program**

*It is suggested the set back area is revegetated at a greater percentage. Litter is determined to be 2%, therefore, include vegetation in place of the 2% resulting in 60% cover. It is expected that bare ground will not exceed 1%. This basis will be required if a remaining highwall is approved.(BE)*

*Provide detail regarding the highwall slopes and how they will be managed. (BE)*

**110.5.12** *How will water be diverted away from the highwalls? The highwall would be considered environmentally sensitive, what erosion and sediment control practices would be established and implemented? (BE)*

#### **R647-4-111 - Reclamation Practices**

*Limited Division comments at this time is not an indication of acceptance of other provisions to this requirement. (BE)*

##### **111.6 Highwalls stabilized at 45 degrees or less**

*Provide specific information in the form of a table showing the following: slope dip, direction of the dip, friction angle of the discontinuities, orientation of the discontinuities within the rock mass. Within the Kleinfelder report, figure 5, The Markland analysis shows the slope is kinematically marginally stable at 53 °, since this analysis does not include all potential impacts of other mechanisms that can influence slope stability, further evaluation is required to approve the highwall variance at 63 °. More related comments under variance. (BE)*

*There are a variety of failure modes that can occur, the Markland analysis evaluates the rock block failures and associated wedge failures. Since other potential failures types can occur in bedrock material structure; ranging from falls, slumps, flows, and slides, further evaluation is required. Surface drainage characteristics must be determined in the highwall area(s). More related (BE)*

*Highwalls are visually degrading and improving aesthetics should be part of the plan. The Division encourages an aesthetics plan. (BE)*

#### R647-4-112 – Variance

*Please be aware that in the future, if a variance is granted, the operation and reclamation plan must be redefined. (BE)*

*The text refers to the slope stability study provided by Kleinfelder and the following comments are directed specifically to its content. Be aware, that having a stable slope is fundamentally important, but that the environmental impact of leaving a highwall in place includes that it must be in a safe and stable environmental condition. Therefore, erosion and sediment measures must be addressed as part of the plan. (BE)*

#### *Kleinfelder report comments:*

- *The report provides geotechnical and geological documentation of the area, and is not specific enough to qualify as a full slope stability study for the sake of leaving highwalls at reclamation. (BE)*
- *For the sake of the report and its intended purpose, the data used for the kinematic analysis is appropriate, but for highwalls to remain, in depth studies are required. (BE)*
- *Figure 4 shows that a bench face forming (steep west dipping) set may also exist. The orientation of this set should be estimated for stereographic analysis of the proposed 81° bench faces.*
- *RQD: it would be helpful to document whether 2D (2x1.75) or 4-in was used in the numerator.*
- *Markland analysis: It would be helpful if a table or database of all photo-interpreted structural orientations used in the analyses was provided.*
- *The great circles shown in figure 6 are not, but should be the same regardless of the cut slope angle. How did the differences arise?*
- *Slope Stability Design: Wedge failure geometries are kinematically viable for slopes greater than 45°. A table should be provided of the plunge and plunge directions of the line of intersections for all wedges as well as develop a histogram of wedge plunge.*
- *Rockfall analyses of potential rock blocks should be conducted to assess the adequacy of 30-ft benches every 100-ft along the proposed final 63° quarry wall. (BE)*

Variance Review  
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UDOT BECK STREET  
September 27, 2007

**R647-4-113 - Surety**

*Surety may be adjusted as a result of the proposed variance. Amount of surety cannot be determined at this time. (BE)*

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